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Nutritional Disease in Farm Animals—A Review of Recent Research*

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WHILE there are many conditions listed in domestic animals as being due to nutritional deficiency it is only in very few cases that we have sufficient evidence to satisfy the postulates suggested by Stewart (1951) as required to justify the statement that deficiency of a particular constituent of the diet is the cause of a definite disease syndrome, *viz.*,

(1) a positive correlation between the occurrence of the disease and the deficiency in the diet of the particular factor concerned;

(2) cure or prevention of the disease by the addition of the particular constituent to the deficient diet; and

(3) production of the disease in normal animals by feeding an artificial diet adequate in every essential constituent except that suspected, which should be present in amounts comparable to those found in diets which produce the natural disease.

These postulates, particularly the latter, are not always satisfied and we are still in doubt regarding the rôle of diet in many well-established disease syndromes. One which comes near to satisfying them completely is the nutritional anaemia of ruminants caused by cobalt deficiency, which in the light of recent work might well be renamed Vitamin B_{12} deficiency.

Cobalt Deficiency

While it has been known for nearly 20 years that cobalt deficiency was confined to ruminants grazing particular areas with a soil content of cobalt of less than 3 to 4 p.p.m., so that the pastures contained less than 0.07 p.p.m., and while it has been known even longer that small doses of cobalt are both curative and prophylactic, it is only within recent years that it has been possible to devise a predominantly artificial diet supplying less than the sheep's estimated minimum requirements for cobalt (Stewart, 1951). Using this, various workers have studied the site and mode of action of cobalt, *e.g.* Phillipson and Mitchell (1952) and Stewart (1953), and confirmed that it was required only in the rumen, where it had the effect of stimulating appetite without increasing the efficacy of food conversion.

A new chapter in the study of cobalt deficiency was opened up by the discovery that cobalt was a constituent of the anti-pernicious anaemia factor, first isolated in 1948 as a red crystalline cyano-cobalt complex known as vitamin B_{12}. This is also significant as part at least of the animal protein factor, important for health and growth of animals on a purely vegetable diet, and for good hatchability in eggs, and known for some time to be present not only in animal tissues but also in ruminant faeces. Vitamin B_{12} is apparently synthesised exclusively by micro-organisms and is found in considerable amounts (60 μg. per 100 g. D M.) in the rumen contents of normal sheep (Hale, Pope, Phillips & Bohstedt, 1950), whence it is absorbed and stored in the liver, but is present in smaller amounts in the rumen in cobalt deficiency, suggesting deficient production. Then after some abortive attempts due to using too small doses a number of investigators have demonstrated the curative effects of parenteral administration of relatively large doses of vitamin B_{12} *cf.* Marston and Lee (1952), Hoekstra, Pope and Phillips (1952), with prompt stimulation of appetite and concordant live-weight gain and subsequent alleviation of anaemia. More recently, Andrews (1954) showed that lambs

* Paper presented to the Second British Caribbean Veterinary Congress, Kingston, Jamaica, July, 1956.

grazing cobalt-deficient pastures responded as well to weekly injections of 100 μg. of vitamin B_{12} as to oral doses of cobalt of 7 mg. per week. Similar doses of B_{12} *per os* were not so effective, and one single dose of 1,000 μg. orally only acted for about two weeks; and Kercher and Smith (1956) have confirmed that there is no tissue synthesis of vitamin B_{12} after oral administration of cobalt, so that the increase in blood, liver, kidney, etc. after oral cobalt administration is presumably due to absorption from the alimentary tract following synthesis in the rumen. The general picture that emerges, therefore, is that the rôle of cobalt in ruminant nutrition is to serve as an integral part of vitamin B_{12} which results from the metabolism of rumen micro-organisms and is apparently an essential metabolite necessary for the maintenance of normal appetite in the ruminant and thus indirectly essential for normal growth and health. Why other species like horses and rabbits do not develop a similar condition when grazing deficient pastures is still something of a mystery, for one would have expected the relative basic requirements of a tissue metabolite like vitamin B_{12} to be somewhat similar in all species; but the difference in dosage requirements between man and sheep demonstrates conclusively that this is not so.

The discovery is unlikely to make much change as yet in prophylaxis, as the response to vitamin B_{12} is no more certain and certainly less economic than cobalt administration. The one main snag in current prophylactic procedures is the difficulty in some cases of ensuring adequate top-dressing of rough hill grazings, especially in terrain where aerial application is impracticable. The demonstration by Stewart *et al.* (1955) that monthly dosing with 1 g. cobalt chloride (250 mg. Co) was almost as effective a prophylactic as top-dressing with cobalt sulphate at the rate of 2 lb. per acre, holds promise of reasonably effective action which could be taken at the time of normal gathering of lambs for ordinary husbandry purposes. The unravelling of this B_{12} story in ruminants may prove of some help, however, in diagnosis which at the moment is largely dependent on a study of liveweight gains in adequately controlled grazing trials, so that the estimation of vitamin B_{12} in the rumen contents or in blood or tissues might offer a more rapid and easier diagnostic aid.

Copper Deficiency

Copper deficiency can complicate cobalt deficiency and it can also occur apparently in cases where the cobalt supply is satisfactory but the copper deficiency story is by no means so simple or so clear as in the case of cobalt. In the first place while there is circumstantial evidence in support of the view that a straightforward copper deficiency can cause enzootic ataxia in lambs and defective wool formation in ewes, as well as falling disease and some peat scours in cattle, most of the claims are based largely on the application of the second of the postulates mentioned at the start of this paper and I have not been able to trace any experimental evidence satisfying the third, so that the presence of some "toxic" or "interfering" factor has never been completely ruled out. This is all the more important in the light of the "teart" story (Ferguson, Lewis & Watson, 1943) where it was found that excess of molybdenum in the diet could produce symptoms suggestive of copper deficiency and curable by copper therapy in animals grazing pastures with normal copper content; and of the occurrence in Britain of swayback in lambs corresponding clinically and therapeutically to enzootic ataxia but developing on pastures adequate in copper and with little correlation with molybdenum intake. The factor in pastures which induces this disease is still unknown, the view that a high lead intake might be involved being rather negatived by experiments at Weybridge (Allcroft, 1952) which showed that the administration of large doses of lead acetate to normal sheep did not produce hypocupraemia, nor did it increase the incidence of ataxia in the lambs of hypocupraemic ewes.

A similar mystery surrounds the copper deficiency in cattle in parts of England (Allcroft & Parker, 1949) evidenced by chronic diarrhoea and unthriftiness on pastures with average copper content as high as 14 p.p.m. dry matter (range 8 to 23) and molybdenum averaging 4.4 (range 2.3 to 7.4) and the Copper Pine diagnosed in young cattle in the north of Scotland (Jamieson & Allcroft, 1950) where depigmentation and unthriftiness unaccompanied by anaemia and confined apparently to young animals was found also to be associated with low blood and liver copper values and to respond to copper therapy although the pasture was again "normal" and there was again no direct correlation with molybdenum intake.

One possible clue to this confusion may be found in the work of Mills (1954) on differences in availability of copper in "affected" and "unaffected" pastures. Another may arise from the work of Dick and others in Australia on the relationship of inorganic sulphate to copper-molybdenum interactions. Starting with the observation (Dick, 1952) that lucerne hay and oat hay had different effects on the ability of dietary molybdenum to lower liver copper levels in sheep, it was shown (Dick, 1953) that inorganic sulphate which was present in considerable amounts in lucerne hay had a significant effect on the level of blood molybdenum when administered orally; and that the same factor in combination with molybdenum effectively limited copper storage (Dick, 1953). This was taken a step further in 1954 (Dick, 1954) by the demonstration that at each level of molybdenum in the diet the amount of copper stores in the liver was progressively less as the inorganic sulphate intake increased, so that the end result in copper retention depended not on dietary copper or molybdenum alone but on the relative intakes of all three ions. Wynne and McClymont (1956) have recently extended these observations by showing that sheep could remain healthy on a diet containing 5.2 p.p.m. of copper, 0.8 p.p.m. molybdenum, and 0.04 per cent. SO_4, while supplementation with molybdenum to 5 p.p.m. and of SO_4 to 0.4 per cent. resulted in hypocupraemia, with not only low liver copper but also typical hypochromatrichia and dystrophic wool; and that even

lower molybdenum levels (0.8 p.p.m.) could be associated with hypocupraemia if the sulphate was high. From the general picture that is emerging, therefore, it would seem that under certain circumstances sheep can be in copper balance at very much lower levels of copper intake than was at one time believed—probably less than 1 mg. per day—but that a very small intake of molybdenum can affect copper retention if the sulphate intake is high; while high molybdenum with low inorganic sulphate has not so marked an effect as the reverse combination. Whether or not inorganic sulphate is the only dietetic factor with this synergistic effect only time will tell, but it may not be irrelevent to note that the molybdenum story so far as clinical disease in Britain is concerned is largely one involving cattle rather than sheep and that the curative effects of copper in these conditions has usually been demonstrated by its use in the form of sulphate!

Piglet Anaemia

Anaemia in suckling pigs during their first few weeks of life, which has usually been regarded as a simple and straightforward story of iron deficiency in sow's milk, has also become the subject of some controversy and confusion. Originally described by McGowan and Crichton (1923), it has been encountered and studied by workers in many parts of the world and is usually considered as an iron-deficiency anaemia associated with the fact that a young growing piglet requires considerably more iron (circ. 7 mg. per day) than the sow's milk can supply (probably not much more than 1 mg. per day) (Venn, McCance & Widdowson, 1947) The development of anaemia in the absence of therapeutic administration or of access to soil (which often contains 1 to 1½ per cent. of iron) was, therefore, understandable and has generally been accepted as the main cause of the anorexia, dyspnoea, cardiac insufficiency, and liver changes recorded. However, Rowett workers (Howie, Biggar, Thomson & Cook, 1949) encountered classical anaemia in piglets given ample doses of iron during some studies on pig housing, especially in those farrowed in cold, damp, and draughty indoor pens with cold uninsulated floors. These anaemic pigs showed the typical liver lesions described by McGowan and Crichton as characterising nutritional anaemia, and the pathology has been studied in some detail by Naftalin and Howie (1949) who suggested that the condition was due largely to cold environmental conditions, especially when applied directly to the abdomen of the young pig. However, Shanks (1953) has encountered this " big liver disease " sporadically in pigs three to five weeks old with all the symptoms of nutritional anaemia although many had not only received ample iron but had also been kept under a variety of conditions—indoors and out of doors in winter and on occasion in summer—and it is now thought by some that the disease may be caused by a virus or possibly by some nutritional defect other than lack of iron (Lucas, 1956). The true significance of iron deficiency in the diet of young pigs, therefore, still awaits fundamental studies utilising synthetic diets such as those briefly referred to by Tribe (1954). Such observations as have been made so far tend to suggest that straightforward iron deficiency can cause anaemia but that the health and appetite of the pigs is not necessarily adversely affected thereby to any marked extent, so that other factors may well have played a part in various disease outbreaks reported hitherto under this heading. In this connexion it is interesting to note that in studies on cardiac enlargement in piglet anaemia Widdowson and McCance (1955) record that they found it difficult by dietetic means to produce an anaemia severe enough to stimulate a measurable degree of cardiac enlargement and that they had frequently to supplement them by bleeding as well.

In the meantime in view of the widely held belief that lack of iron in the diet of the suckling pig leads to failure of appetite and consequent unthriftiness and even death, research continues into more efficient and less tedious methods of iron administration. Barber *et al.* (1955) claim that intramuscular injections of 100 mg. of iron as an iron-dextran complex at seven days old is as effective as oral administration of 30 mg. of iron pyrophosphate daily from the 4th to the 10th day; but they were also able to confirm (Barber, Braude & Mitchell, 1955) that outdoor rearing had a still better effect on blood haemoglobin levels, which they suggest was due to a more continuous supply of iron in the soil and later in the food as a result of better appetite in outdoor reared pigs. More recently, however, it has been suggested on the basis of an interesting if somewhat limited experiment (Weipers & Inglis, 1956) that piglets thrive equally well indoors or out of doors provided the sows have run out of doors prior to parturition, so what the ultimate story will prove to be I shall not venture to forecast!

Hypomagnesaemia

Hypomagnesaemia and associated disease in cattle (grass tetany, lactation tetany, etc.) are not usually regarded as resulting from nutritional deficiency though Norwegian workers (Brierem, Ender, Halse & Slagsvold, 1949) encountered hypomagnesaemia in stall-fed cattle on a low magnesium-low energy diet. It has usually been attributed to some " physiological dysfunction " which was thought to be precipitated by a variety of causes, one of the commonest being the turning out of cattle to graze on rapidly growing pastures, especially in the spring and autumn, though the incidence in beef cattle was often higher in the winter months; and the apparently straightforward nutritional deficiency produced experimentally in calves given milk as their sole diet for considerable periods (Duncan, Huffman & Robinson, 1935) has usually been regarded as something of an academic curiosity—though even there the greater effectiveness of dietary foodstuffs than of magnesium salts in correcting any deficiency (Huffman, Conley, Lightfoot & Duncan, 1941) suggested that magnesium deficiency might not be the only factor involved. This has been further investigated in recent years by Blaxter and his colleagues at the Hannah Dairy Research Institute (Blaxter, Rook & McDonald, 1954) who produced an uncomplicated magnesium deficiency in

young calves on a synthetic diet said to be adequate in all other known essentials. Hypomagnesaemia developed slowly on diets supplying less than 14 mg. magnesium per 100 ml., and on more grossly deficient diets (less than 5 mg. per 100 ml.), when the blood magnesium fell below 0.7 mg. per 100 ml. serum, clinical signs of hypersensitivity, opisthotonus, and eventually convulsions, which were frequently fatal, developed. *Post-mortem* examination failed, however, to demonstrate the pathological calcification of vascular tissues recorded by American workers, the main findings being acute congestion of internal organs and the presence of massive haemorrhages especially in the heart and larger blood vessels.

In 1955, in the course of an investigation into the occurrence of muscular dystrophy in calves in the north of Scotland, Blaxter and Sharman (1955), encountered a naturally occurring hypomagnesaemia in suckling beef calves, characterised by a slow fall in blood magnesium during the first two months or so of life in animals receiving little or no food apart from the mother's milk. In occasional animals the fall was sufficient to result in neuromuscular irritability and tetany, especially in rapidly growing animals suckled on the best milking cows, the incidence being estimated at about 5 per cent. Balance experiments (Blaxter & Rook, 1954) showed that the magnesium requirements of young growing calves were considerably greater than the amount supplied by the predominantly milk diet and further evidence in support of the nutritional deficiency theory came from the fact that it could be prevented by a daily dietary supplement providing 500 mg. magnesium by mouth. Since experimental deficiency results in considerable depletion of bone magnesium (Blaxter & McGill, 1956) it has been suggested that bone analysis can be used to confirm the diagnosis in suspected fatal cases, a ratio of Ca to Mg of 60 to 1 being regarded as normal while values above 90 to 1 are said to indicate severe depletion due to magnesium deficiency. In our own rather limited experience to date this method has not proved so simple or so satisfactory as the original claims led us to believe.

Hypomagnesaemia in adult cattle is not such a clear-cut story but it has been taken a step further by the work of Bartlett and his colleagues (Bartlett, Brown, Foot, Rowland, Allcroft & Parr, 1954) on the influence of fertiliser treatment of grassland on the incidence of hypomagnesaemia in milking cows. These workers showed that the occurrence of hypomagnesaemia in grazing cattle was closely associated with heavy applications of sulphate of ammonia (6 cwt. per acre) to the pastures, which produced blood changes in 11 out of 15 cows with clinical signs in five and death in two cases and that it could be prevented by top-dressing with calcined magnesite (87 per cent. magnesium oxide) at a rate of 25 to 30 cwt. per acre. The hypomagnesaemia was not directly correlated with magnesium supply though high intakes (over 30 g. per day) seemed to prevent it. Other workers (Allcroft, 1954) have confirmed that feeding or drenching with 2 oz. magnesium oxide per day can increase serum magnesium from subnormal to normal levels and maintain values within the normal range while hypomagnesaemia occurs in untreated animals, but they have usually noticed a rapid fall in blood magnesium when mineral feeding stopped so that for prevention it is recommended to try to maintain a continuous supply of adequate amounts of the element in the diet during the susceptible period.

Our present picture of the occurrence and pathogenesis of hypomagnesaemia in the adult bovine still suggests some interference with magnesium absorption and metabolism rather than an uncomplicated dietary deficiency. One possible factor has been suggested by investigations (Head & Rook, 1955) into changes in blood composition, rumen fermentation, and mineral metabolism occurring when cows are transferred to grazing or fed cut spring grass in their stalls. These showed a reduction in urinary Mg output accompanying the serum fall, which was interpreted as indicating reduced absorption; and there occurred at the same time a rise in the ammonia concentration in the rumen and blood. The production of similar rumen ammonia levels by the administration of soluble ammonium salts was accompanied by similar reductions in urinary and serum magnesium. This finding may explain the occasional records of cattle fed rations containing 15 per cent. ammoniated molasses developing temporary mental symptoms and running into fences and other objects (Anon, 1954), as well as linking up with the exacerbating effects on hypomagnesaemia of ammonium fertilisers, and the apparent correlation between the incidence of the disease and the nitrogen content of the growing grass.

Aphosphorosis

Aphosphorosis, the first deficiency disease to be studied extensively in farm animals, came into prominence again with the claim by Hignett (1951) based on a dietary survey of 802 cows and heifers in 39 herds, that the ordinary dietary phosphate allowances usually recommended in Britain were insufficient for maximum fertility, as there was a significant direct correlation between phosphate intake in excess of official British standards and conception rate, up to 100 per cent. or more above a maintenance standard of 10 g. P per day. The results were also held as supporting previous claims by the author that calcium-phosphorus imbalance due to excess of either is often associated with a breeding problem.

These results were somewhat surprising in view of the relative rarity of reported instances of clinical aphosphorosis in cattle in Great Britain, a phenomenon attributed usually to a combination of factors —few grossly phosphorus-deficient areas, conditions of temperature and rainfall favourable to grassland productivity, and the widespread practice of supplementary feeding with cereals and other substances rich in phosphate. Moreover, in the few cases in this country which have been confirmed by blood analysis (*e.g.* Ewer & Sellars, 1950), no particular note was made of infertility being a special problem. This survey evidence has been criticised because of the restriction of attention to two dietary factors, *viz.*

Ca and P, to the exclusion of others which might be important such as protein and vitamin D (Abrams, 1952). However, in a subsequent paper (Hignett, 1952), results were given of an experiment with 23 heifers divided into seven groups on a basic low-phosphate diet with varying amounts of added dihydrogen sodium phosphate, whose reproductive history was closely followed to determine the relationship of dietary phosphate to fertility. Though the groups were small the authors concluded that for such housed heifers a minimum daily allowance of 22 g. P was necessary for satisfactory fertility, a figure a little above American recommendations and considerably above official British standards. Later (Hignett, 1953), a re-examination of their survey data led the authors to the conclusion that the effect of increased phosphate in improving fertility had been most marked at the time when the animals' vitamin D supplies were likely to be running down.

Recent Australian experiences with suspected aphosphorosis ("peg-leg" disease) during drought conditions in the Northern Territory have been summarised by Barnes and Jephcott (1955). The disorder which was characterised by loss of condition, rough staring coat, stilted gait, swollen joints, and kyphosis, occurred on soils deficient in phosphorus (less than 0.05 per cent. P_2O_5) and the pasture samples were also low while the serum inorganic phosphates varied from 1.41 to 3.88 mg. per 100 ml. and the authors concluded that it was the result of an uncomplicated deficiency of phosphate. Various methods of prophylaxis were tried, the most effective being the administration of mono-sodium-orthophosphates (NaH_2PO_4) in the drinking water, as a concentrated solution dispensed into the water from an auxiliary tank, the rate of administration being controlled so as to supply about 4.5 g. P per head per day. This was more effective though more expensive than provision of bone meal with or without salt. A similar labour-saving and equable method of supplementation of phosphate to animals through their drinking water has been developed in South Africa utilising the cheaper and usually more readily available fertiliser superphosphates. The main danger there is the possible presence of considerable amounts of fluoride but fortunately this substance is less soluble in strong solutions and, therefore, settles out, when the bulk of the fluoride left in the supernatant liquid can be precipitated by boiling. The utilisation of superphosphate in the drinking water depends, therefore, on first preparing a concentrated extract of its phosphate, then heating this clear solution to boiling point followed by an appropriate dilution of this extract in the drinking water (Reinach & Louw, 1952).

Interesting as these various observations are, they can by no means be regarded as completely satisfactory and indeed the unravelling of the whole story must await more accurate knowledge of phosphate requirements of ruminants under various conditions and the relationship of phosphate to other dietary essentials.

Vitamin Deficiency

In the vitamin field there does not appear to have been such intensive activity recently so far as farm animals are concerned, as I have indicated in connexion with mineral deficiencies. In fact, apart from the work on vitamin B_{12} outlined earlier, the only one which appears to have been the subject of really intensive study during the period under review is vitamin E.

Vitamin E was originally recognised as a fat-soluble substance essential for normal reproduction in the rat as the name tocopherol (lit. offspring-bearing) still bears witness. We now know, however, that vitamin E deficiency can be accompanied by a somewhat surprising assortment of abnormalities in various species, the most frequently occurring being lesions in skeletal and other muscles, often termed "muscular dystrophy." This has been produced experimentally in many species, particularly in the young animal when the combined placental and lactation transfer proves insufficient to meet the need of the organism at a time of rapid muscular growth, and it has been suspected for some time that somewhat analogous conditions in farm animals, especially lambs (stiff lamb disease) and calves (enzootic muscular dystrophy), might be due to a similar cause. But the production of vitamin E deficiency in farm animals has not proved a simple matter, and in the case of cattle, Gullickson and his collaborators (1946) found that prolonged feeding of a deficient diet had little adverse effect apart from a tendency to cardiac failure. However, Blaxter and his colleagues at the Hannah Dairy Research Institute (1954) produced vitamin E deficiency in calves accidentally in the course of studies on nitrogen metabolism, using a synthetic diet consisting mainly of spray-dried skim milk powder and lard; within 24 to 60 days calves became weak and ataxic with occasional signs of inability to drink or of cardiac failure, and *post-mortem* examination showed lesions in skeletal and cardiac muscles somewhat similar macroscopically and to a lesser extent microscopically to those of vitamin E deficiency in guinea-pigs; and the administration of α-tocopherol acetate was shown to have a curative effect.

This might have been dismissed as more or less an academic curiosity but for the fact that in the spring of 1951, farmers in the north of Scotland experienced an abnormally high mortality in their beef calves turned out to grass in the spring following an unusually long and severe winter. The similarity of the syndrome to that of the experimentally produced muscular dystrophy led to a combined investigation which if it has not produced anything outstandingly new has at least clarified some of the quantitative aspects of the relationship of vitamin E deficiency to acute muscular dystrophy in calves.

The naturally occurring disease, as seen in suckling calves in beef herds in the north of Scotland, has been described by Sharman (1954) who listed three main syndromes, *viz.* (a) muscular dystrophy of skeletal muscles especially in the shoulder and to a lesser extent in the hind limbs and elsewhere, causing stiffness and various degrees of prostration; (b) a cardiac type with sudden death on exertion; and (c) a diaphragmatic type with acute dyspnoea. The salient feature of the pathology of all three types was

the presence in the associated muscles of whitish, non-resilient areas of degeneration, so that the disease was pathologically similar to the experimental vitamin E deficiency described by Blaxter *et al.* (1952) and more recently by Scafford *et al.* (1954) and also to the cod-liver oil toxicity syndrome (Blaxter, Wood & MacDonald, 1953). Between 15 and 25 per cent. of the calf-rearing farms in the area were affected with a morbidity approaching 90 per cent. in some cases and a mortality of up to 50 per cent.

The prevention of the condition by the administration of tocopherol was recorded by Blaxter and Sharman (1953), the dose recommended being 50 mg. daily from birth (Blaxter, 1953), while at least 200 mg. per day are required for treatment (Sharman, 1954). Analysis of the rations fed to the mothers while indoors during the winter months, which consisted mainly of hay, straw, and turnips, showed them to be low in tocopherol (Brown, 1953). the total intake being less than 300 mg. per day, which is probably less than a tenth of the intake of cows fed normally for milk production with a diet including silage, kale, or dried grass, etc. The blood, colostrum, and milk of the dams and the blood and tissues of the calves were also shown to be low in tocopherol (Garton *et al.*, 1956). All this seems to confirm the suggestion made in 1947 by Vawter and Records (1947) that muscular dystrophy in calves might be due to a vitamin E deficiency. That the story is not quite so simple as that, however, is suggested by the fact that while it is difficult to produce muscular dystrophy experimentally in calves by vitamin E deficiency unless in the presence of unsaturated fatty acids, colostrum and milk analyses have failed to show any significant difference in the degree of unsaturation of fat in milk from cows on diets likely to produce the disease compared with adequately fed controls (Garton *et al.*, 1956). The variable incidence of the disease, the importance of muscular exertion, and the fact that higher tocopherol levels are required to cure the naturally occurring disease than that produced experimentally are also still unexplained.

Stiff lamb disease, which has been known for nearly 30 years in the United States as a hazard of suckling lambs a few weeks old turned out to pasture in the spring has apparently a somewhat similar pathogenesis. It has been known for some time that tocopherols could act both therapeutically (Willman *et al.*, 1946) and prophylactically (Willman *et al.*, 1945) and that it could be produced by feeding the ewes diets low in tocopherol (Whiting *et al.*, 1949), while Culik *et al.* (1951) produced stiff lamb disease on a synthetic diet low in tocopherol for two to four weeks, commencing when lambs were two to four days old. Recently, Hartley (1953) described a specific myopathy of lambs in New Zealand with lesions similar to those reported in stiff lamb disease. As both the ewes and lambs were either on or just driven off rich clover pastures, it seemed unlikely that the condition was an uncomplicated vitamin E deficiency. This links up with the fact that in all experimentally produced vitamin E deficiencies on synthetic diets, some rich source of unsaturated fatty acids like lard or cod-liver oil was usually present, while Blaxter records that he has been unable to produce muscular dystrophy with diets very low in vitamin E which contained no fat (Blaxter, 1955).

It seems likely that low vitamin E in the diet is one of the factors involved in these muscular dystrophies but the rôles of other dietary factors and of muscular exercise still remain to be clarified. Adequate prophylactic measures are, therefore, still difficult and must remain so till we know something about these factors, and also have more accurate knowledge of the vitamin E content of animal foodstuffs and the requirements of the various animal species.

It is not possible in a review of this sort to deal adequately with all the research work in this particular field even within the limited span of approximately five years over which I have ranged, and there are, therefore, many interesting observations on the relation of dietary factors to disease which I have not mentioned. Included amongst these are the rôle of zinc in the aetiology of parakeratosis or dry-feeding dermatitis of pigs (Luecke, Hoeffer, Brammell & Thorpe, 1956), the possibility of goitrogenic factors being involved in iodine deficiency syndromes in domestic animals (Sinclair & Andrews, 1954), the claims that administration of large doses of vitamin D can, on the one hand, prevent milk fever (Hibbs & Pounden, 1955), and on the other produce calcification of the walls of the aorta and heart in calves (Hannah, 1956), and the vitamin A deficiency that is involved in the hyperkeratosis (X-disease) produced by chlorinated naphthalenes (Hensel *et al.*, 1951; Hoekstra *et al.*, 1954). Some of these, of course, can hardly be included under the title nutritional deficiency but all are fascinating and would warrant discussion if space allowed. I hope, however, that I have covered a wide enough field to stimulate a useful discussion on a limited but interesting, if occasionally still somewhat obscure, aspect of veterinary science.

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In Brief

Pharmacology of the Central Nervous System

Barbiturates. Considerable knowledge has accumulated on the distribution of barbiturates, their metabolic degradation (Raventós, 1954) and new anaesthetic compounds have been described with even shorter action than thiopentone (Crawshaw, 1955; Swanson & Chen, 1953; Petersen *et al.* 1953). The most interesting development, however, concerns the understanding of the ultra-short action of thiobarbiturates such as thiopentone-sodium and of new N-methyl barbiturates. Their brevity of action is not due to very rapid metabolism by the liver and the kidney as was previously thought, sod. thiopentone being metabolised at only 5 per cent. per hour in the dog as compared with 15 per cent. per hour for sod. pentobarbitone (Brodie *et al.*, 1953). Instead this brief anaesthesia is due to the passage of these ultra-rapidly acting barbiturates, but not other barbiturates, into adipose tissue. This occurs sufficiently quickly to diminish plasma concentration below the anaesthetic minimum in a short time (Brodie, 1952). However when the body fat becomes loaded with these drugs their concentration in the plasma will remain high, which explains why ultra-rapid recovery is no longer characteristic of these drugs when given repeatedly for maintenance anaesthesia. Moreover the plasma clearance by fat of single doses, is proportional to the degree of adiposity in individual animals, a factor possibly concerned in the prolonged anaesthesia seen with sod. thiopentone in lean animals such as greyhounds (correspondence *Vet. Rec.* 1956).

Reversal of action of barbiturates. Bemegride and its sodium salt is a recently developed analeptic with a particularly high activity against barbiturates, and has been used extensively in man (Shulman *et al.*, 1955; Bentel *et al.*, 1956) and somewhat less in domesticated animals (Baker, 1956; Turner & Hodgetts, 1956; MacFarlane & Bentley, 1957) to combat barbiturate intoxication and to lighten barbiturate anaesthesia immediately after operations. Given intravenously, it has rapid but short action, and repeated injections may be necessary. The drug stimulates the vital medullary centres, including the respiratory centre and may thus be life-saving. It is, however, a stimulant to other parts of the C.N.S. and not only lightens anaesthesia, but like other analeptics in overdose will produce short-lived convulsions. Although apparently more effective against barbiturates than against other depressants (Somers, 1955; Shaw, 1955) this antagonism is not cleanly competitive (Hahn *et al.* 1956; Jalling, 1956; Bottiger *et al.*, 1957) like that shown by nalorphine against morphine (Klavanco & Johnson, 1954) and its newer substitutes such as thiambutene (Owen, 1955). In dogs, rabbits,

Symposium *

Clinical Problems in Everyday Practice

S. F. J. Hodgman : Joan O. Joshua : Rosemary Welch :
R. Churchill Frost : C. E. Woodrow

Cauterisation of the Membrana Nictitans

BY

S. F. J. HODGMAN,

The Animal Health Trust, Canine Research Station, Kennett, Suffolk

THE small operation I wish to describe to you is to overcome the chronic lacrimal discharge which we so often have to deal with, particularly in breeds that have prominent eyes, such as Pekes etc., and where collyriums appear to have little or no effect.

The operation consists of cauterising the under surface of the membrana nictitans with a saturated carbolic acid solution. The necessity for the operation only arises when the under surface of the membrane is granulated. In my opinion this lacrimation is caused almost entirely by this condition and, as you know, is followed so often by excoriation of the face on the inner canthus of the eye.

This operation can be done under a local anaesthetic, but until one is more conversant with it I would strongly advise giving an anaesthetic of short duration. The animal is then held in an appropriate position by an assistant and a little cocaine (I usually use codrenine) is dropped into the affected eye. Once this has acted the membrane is then everted using clip fixation forceps, exposing the granulated surface of the membrane. At this stage it is advisable to place a little quickly-melting ointment on the eyeball so as to protect it against any of the carbolic coming in contact with the cornea. The granulated surface is now dried by dabbing gently with a small piece of cotton wool. The actual cauterisation takes place by using a probe onto which has been tightly twisted a small piece of cotton wool; this swab is saturated with carbolic solution and the surplus drops shaken off before rubbing the membrane. The membrane is rubbed quite violently, even to the extent of causing

(*Continued on page* 659)

*Presented to the Central Veterinary Society, March 7th, 1957.

In Brief.—*Concluded.*

sheep and other mammals bemegride gives good reversal of barbiturate depression but in cats, although anaesthesia is lightened adequately, full consciousness is not restored even with convulsive doses.

Fluothane. A new volatile anaesthetic, "Fluothane" has recently been used successfully in dogs, cats, laboratory animals (Reventós, 1956) man (Johnstone, 1956) and domesticated animals (Hall, 1957). It is more potent than ether or chloroform but is virtually free of irritant properties so that induction is smooth and rapid. Recovery is similarly rapid even after prolonged administration of several hours. Despite its high halogen content the drug is well tolerated by liver and kidneys. This high potency is however a limiting factor in that open mask ("drip") methods of administration, with their inherent variations in anaesthetic concentration, give inadequate control of depth of anaesthesia. There is slight sensitisation of the heart to adrenaline but this appears relatively unimportant since excitement during induction is minimal. A pronounced fall in blood pressure due to block of autonomic ganglia and splanchnic vasodilation accompanies anaesthesia. This, as with the use of hexamethonium salts (Clark & Weiss, 1952) can be advantageous in giving a relatively blood-free field for general (but not abdominal) surgery. R. J. Fitzpatrick (June, 1957).

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ROYAL COLLEGE OF VETERINARY SURGEONS
Page 88 Dansk Maanedsskrift for Drylaeger, for "1949–" read "1949–1955"

Page 88 Dansk Maanedsskrift for Drylaeger, *for* " 1949– " *read* " 1949–1955 "

Page 89 Hufschmied, Dresden, *for* " 1883–1890 " *read* " 1883–1944 imp."

Page 90 Maanedsskrift for Drylaeger, *for* " 1920–1949 " *read* " 1891–1949 imp."

Page 91 Münchener tierärztliche Wochenschrift, *before* " [C. as : Berl. etc." *insert* " [C. of : Wochenschrift für Tierheilkund und Viehzucht]."

Delete " N.R.C. Research News. Ottawa, 1948–."

Norden News, Lincoln, *add* after " imp." " 1955–."

For " Notiziaro dell' Istituto " *read* " Notiziario dell' Istituto."

Page 92 Last line *for* " Bogatá " *read* " Bogotá."

Page 93 Revista de med. vet. Lisboa, *for* " cienias " *read* " ciencias."

Skandinavisk veterinärtidskrift, *for* " [*C. as* : . . ." *read* " [*C. in* . . ."

Spisy vysoké skoly veterinari. Brno, *for* " 1949– " *read* " 1949–1952."

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Page 94 *For* " Tijdschrift voor vergelijende Geneeskund. Leyden, 1922–1925 " *read* Tijdschrift voor vergelijende geneeskund. Leyden. 1922–1925."

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Page 95 Wochenschrift fur Tierheilkunde und Viehzucht, *for* " Augsberg " *read* " Augsberg & München." *Before* " Augsberg " *insert* " [*C. as* : *Munch. tierärztl. Wschr.*]."

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Note on German Periodicals—replace present entry by :—

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Page 15 Dollar, J. A. W., first entry, second line, *for* " 1. Operative surgery " *read* " 1. Operative technique."

Page 29 Hammond, J., first entry, *for* " 1953 " *read* " 1952."
Hammond, J., seventh entry, second line, *delete* [*Vols.* 2 *&* 3 *in press*].

Page 34 International Veterinary congress, *for* " 3. Paris, 1889 " *read* " 5. Paris, 1889."

Page 72 Column 3, fifth entry under **Breeding,** *for* " Hammond, 1953 " *read* " Hammond, 1952."

Page 76 Column 3, eighth entry under **Horses, anatomy,** *for* " Share-Jones, G.", *read* " Share-Jones, J. T."

Page 86 Archivos da Escola superior de agricultura e medicina veterinaria, *for* " Nichtheroy " *read* " Nictheroy."
Arhiva veterinaria, Bucuresti, *for* " 1913–1939 imp." *read* 1907–1939 imp."
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it to bleed, and this is continued until the area turns a dark brown in colour.

The cauterised area is then dabbed with a small piece of cotton wool to remove any superfluous solution or debris, and the same ointment as used previously on the eye-ball is now smeared over the cauterised surface. A second or two is allowed for the ointment to dissolve. The clip forceps are then removed allowing the membrane to fall back into its normal position.

If necessary, the same procedure is carried out on the other eye. It is seldom that one finds this condition unilateral, although one membrane may be more affected than the other.

In my experience this treatment is 100 per cent. successful for this particular condition, and even in the very worst cases complete recovery takes place in a period of 14 days. I am not basing this statement on a few cases; I have been doing it regularly for about 30 years, and my late partner, Cornish Bowden, used this method successfully for years before that.

The Use of Intra-articular Cortisone in Certain Types of Stifle Lameness in the Dog

BY

JOAN O. JOSHUA

Finchley, London

FOR some months I have been using cortisone by intra-articular injection in certain cases of stifle lameness. The number of cases so far treated is not large (about eight) but the results have been sufficiently uniformly satisfactory to warrant this preliminary informal report.

Types of case selected for treatment

These have been cases of stifle injury in which fairly severe lameness has persisted for several weeks despite routine treatment. I believe the type of injury most likely to respond to this treatment is that in which inflammatory changes have occurred and may be persisting within the true stifle joint, *i.e.*, femoro-tibial articulation. Examples of the type of case are damage of the meniscal cartilages and rupture of the cruciate ligaments.

Materials used

The specially prepared suspension of hydrocortisone acetate which contains 25 mg. per ml. Having had one case of an infected joint despite every aseptic precaution, I would advocate the use of an antibiotic with the suspension—a suitable preparation is available in which neomycin is incorporated in the suspension.

Two syringes are required, adequately sterilised, and as dry as possible, plus a suitable needle; I find a 20 B.W.G. x 1 inch needle suitable for most average or larger dogs.

Technique

The patient should be anaesthetised or narcotised to obviate the risk of breaking the needle in the joint. Thiambutine narcosis is adequate and as this can be antagonised by analorphine, the patient can be returned to the owner at once if desired.

The antero-lateral aspect of the stifle joint is prepared by careful clipping, shaving and cleansing of the skin. The leg is held with the stifle flexed and the upper limit of the tibia is located. The needle is introduced behind the lower patellar ligament and is directed obliquely in a medial and posterior direction towards the joint cavity. Return of synovial fluid indicates correct position and it is sometimes necessary to adjust the position of the needle before this is obtained.

One syringe is then attached and synovial fluid is withdrawn; it is recommended that an equal volume of synovial fluid to that of the intended replacement by cortisone suspension be aspirated. I have found, however, that in these cases there seems to be an increase in the volume of synovial fluid in the joint and it has been my practice to withdraw some 2 to 3 c.c. replacing with only 1 to 1.5 c.c. cortisone suspension (most of my cases have been in biggish dogs). This syringe is then detached and that containing the intra-articular suspension is attached to the needle and the injection made. I have used 1 to 1.5 c.c. suspension according to the joint size. It has been interesting to observe the variation in the appearance of the synovial fluid, ranging from a blood-stained viscous fluid in relatively recent cases to a deep straw-coloured, freely flowing material in old-standing cases.

After effects

As mentioned, one case of infection occurred; this responded readily to penicillin and merely delayed recovery by a few days. All other cases have shown immediate improvement, so rapid in fact that I rather wonder whether the reduction of pressure within the joint by withdrawal of synovial fluid has not been a factor. Pain has not been seen in any case (except, of course, the infected joint) and recovery to virtual soundness has occurred in 7 to 14 days, even in cases where the previous duration of lameness had been months.

This treatment is commended as being worthy of future investigation.

Short Docking of Dogs

BY

ROSEMARY WELCH

Rickmansworth

I FEEL that discussion of this very simple subject is worth while for two reasons. Firstly, I encounter a large number of Boxers which have been badly docked, I hope by lay people, but at least one in my practice was done by a veterinary surgeon, and she has a most disfiguring dent where there should be a tail. Secondly, it may be of interest that the instrument I use is almost a museum piece; it is a pair of rowelling shears, date unknown, but I imagine it was made before the days when it was usual to boil instruments, therefore I apologise for its aged appearance.

I find that this instrument is useful for short docking for the following reasons:—

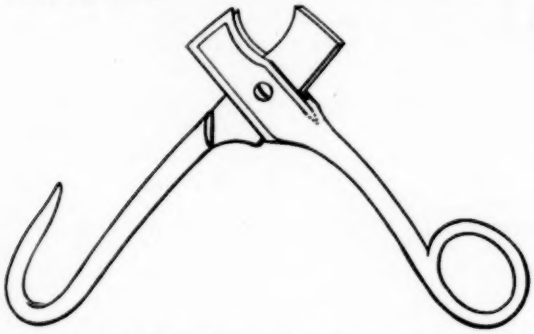
Leith, T. S. *See* Hoerlein, A. B., *and others*. 1954.

Muybridge, E. Animals in motion. An electro-photographic investigation

(1) The concave blade and the double jaw into which it closes make it easy to hold the tail firm and to cut it at the exact point required.

(2) I think it is impossible to dock too short and damage to the anus is unlikely.

(3) The double jaw helps to bring the skin well over the dock.



I prefer to dock all puppies at three to four days for the very obvious reason that losses up to this age can so easily occur and can be blamed on the unfortunate veterinary surgeon.

The technique is no different from that when using ordinary scissors or so-called docking scissors; the area is swabbed with mild antiseptic solution, a moderate tourniquet of narrow bandage or tape is put on, the tail is cut with the cutting blade uppermost, as much skin as possible is saved. Haemorrhage seems to be negligible but in any case I apply friar's balsam on dry cotton wool. The owner is instructed to remove the tapes 20 minutes later.

At one time it would never have occurred to me to ask anyone to hold puppies for docking, but in the case of short docking I think one can be much more precise if the puppies are held.

I mentioned the badly docked Boxer; on the other hand most of the Corgies I see are well-docked, perhaps they have a good technique in Wales.

Extraction of the Carnassial Tooth

BY

R. CHURCHILL FROST

Department of Surgery, Royal Veterinary College

IN the dog the loose or diseased carnassials present no problem. It is the firmly embedded carnassial or upper third premolar that is difficult to extract. This tooth requires removal in the treatment of maxillary fistula, a condition which is often erroneously called a molar abscess.

This upper carnassial tooth has three roots. Posteriorly, there is a large root which is connected above and below the alveolus by a bridge of tooth to two smaller ones. Of these two anterior roots, one is lateral and one is medial, encroaching on to the hard palate.

The method of extraction now to be explained can be described as alveolar resection, loosening of the tooth by leverage, and removal by traction. Firstly, the gum is resected vertically on the lateral aspect and between the posterior and anterior roots. This may be done with scalpel or chisel. The exposed bony alveolus is now boldly resected from the bridge of the tooth using mallet and chisel. Also it is helpful to tap gently beneath the gingival margin round the whole periphery of the tooth. Returning to the lateral aspect of the tooth, the $\frac{1}{4}$-inch chisel is driven between the roots parallel to and towards the hard palate; this chisel is gently levered up and down, thus loosening the tooth.

The tooth can now be removed easily by traction. For this purpose a special pair of molar forceps which do not crush can be used. This instrument is equipped with two hooks which approach beneath the bridge of tooth and, while they do not grip the tooth, enable any degree of traction to be exerted. A pair of No. 16 forceps made by Ash work on this principle.

This method of carnassial extraction has the advantage of not fracturing the tooth, and can be applied in all breeds of dog.

Treatment of Canine Alopecia

BY

C. E. WOODROW

Knightsbridge

MY contribution on the treatment of alopecia fortunately does not include the cause, of which I know nothing. The type of alopecia to which I refer is perhaps most regularly seen in the Scottie and the Chow and includes loss of hair and baldness with blackening of the skin. There are many treatments but most of them are based on ointments or oily dressings—often codliver oil. Apart from being relatively ineffective they are most undesirable in the treatment of a dog in a house or flat.

The prescription I want to give you is most effective and clean—a spirit lotion that is colourless and odourless :—

Resorcin	℥i
Acid Salicyl	℥i
Hydrarg. perchlor.	grs 3 (3 grains)
Glycerin	℥rs
Spts. Industrial 95 per cent.	aa. ad.
Aquam	℥viii

Before treatment the dog should be given a good bath and then the lotion should be applied once daily, and massaged well into the skin. It is advisable for women owners to use rubber gloves as their hands seem to be rather sensitive to resorcin.

I combine this application with thyroid medication in relatively large doses, *i.e.*, two to four grains daily. A watch should be kept on the heart to see that there is no undue acceleration on this dosage.

This lotion is also valuable for the " end " treatment of squamous demodectic mange. I first give two benzene hexachloride baths to destroy any parasites, followed by 10 to 14 days application of oxytetracycline† to control secondary bacterial invaders and finally this lotion for the loss of hair.

† Terramycin topical.

(The remainder of this Symposium will be published next week.)

News and Comment

SEVENTY THIS WEEK

This week THE VETERINARY RECORD enters upon its 70th year, and it is instructive to compare the state of things to-day with those which obtained on July 6th, 1907, when William Hunting surveyed, in a leading article, the first 20 years of the journal's life. He observed that a weekly could fulfil many functions impossible to a monthly or quarterly journal, and that THE RECORD was the only veterinary weekly in existence. To the best of our knowledge this is still the case to-day. He noted that there was "still room for a great increase" in the number of his scientific contributors; but that shortcoming, at least, has been remedied with the years, and we are now hard put to it to accommodate all the material offered. He had "always advocated the higher scientific education of the profession," and it seems reasonable to suggest that the present status enjoyed by veterinary education within the universities would have warmed his heart.

In this journal's early days a notable feature was the lengthy reporting of the proceedings of the Council of the Royal College, and, not infrequently, some pretty tart comment from Hunting's own pen. The proceedings, now, in common with those of the Council of the B.V.A., appear only in the Supplement, and critical comment is made for the most part unnecessary by reason of frequent and cordial exchanges of view.

It is fascinating to speculate whether, among those dreams in which even editors indulge, the founder of this journal ever envisaged THE VETERINARY RECORD as the official organ of a great professional Association, contributing substantially to that Association's assets, enjoying an international circulation, and evidencing in its pages the ever-accelerating advance of veterinary science? Let it be hoped, at least, that William Hunting would not find his original creation too far strayed from the path upon which he set it, nor fallen unduly below the exacting standards he laid down for his authors and for himself.

SUPPLEMENT TO THE R.C.V.S. LIBRARY CATALOGUE

Readers will notice that we are publishing this week, as a special centre insertion, a supplement to the catalogue of the R.C.V.S. library The material has been set by our printers in such a way that the supplement can be detached as a self-contained whole, and when folded across forms a pamphlet of the same area as the library catalogue itself. It is intended that this arrangement should make for simplicity in securing the catalogue and the supplement together as a single piece.

We are asked by the librarian to mention that there are still some copies of the main catalogue left. The price is 5s. to members of the Royal College, and 15s. to private persons, institutes, etc.

THE ROYAL SOCIETY OF HEALTH

At the Sessional Meeting of the Royal Society of Health at Cambridge on June 21st, a large attendance heard Dr. A. G. Kitchell, Senior Scientific Officer of the Cambridge University Low Temperature Research Station present a paper entitled "The Nature of the Agents which Attack Food, with Special Reference to Meat."

Dr. Kitchell emphasised that the significance of the subject lay in the preparation and preservation of food and went on to explain the rôle of bacteria, yeasts, and moulds in the spoiling of meat and other food products. He also briefly summarised their growth requirements and explained how, by modifying their physical and chemical environment it is possible to protect food against their activity. Finally, he stressed the significance of personal hygiene in the handling of food, and how carelessness in alternately manipulating spoiled and fresh material leads to transfer of the spoilage agents from one to the other. It appears, however, that in some cases the spoilage agent is intrinsic in the material as for example in "bone-taint" and in the present state of our knowledge, infection of this sort in meat cannot be entirely prevented but it can be minimised.

NEW POWERS FOR VETERINARY SURGEONS IN EIRE

Veterinary surgeons in Eire will be authorised to enter farms and carry out tests on cattle if necessary without the owners' permission if the Bovine T.B. Bill is passed in the Irish Parliament. The Bill is being hurried through in an effort to have all herds in Eire attested by 1960. It includes provisions for seizing affected cattle and paying compensation to the owners, and the Minister of Agriculture will be granted powers to isolate cattle on lands, ban or restrict the movement of cattle and animal feeding-stuffs, and lay down regulations on the standard of cow byres. The cleaning and disinfecting of cattle vehicles, the holding of markets, fairs, shows, and sales of animals, and conditions under which cattle may be exported will be dealt with in other sections of the Bill.

UFAW SUMMER SCHOOL

Students from all faculties are invited to the UFAW Summer School at Westham House, Barford, Warwick, from Saturday, September 14th, to Saturday, September 21st, 1957.

It is hoped that the programme will include:—

Visits to an artificial insemination centre, and the animal house of a medical laboratory. There will also be talks, discussions, and films on animal welfare problems in Australia, New Zealand, Nigeria, and Germany, the supply of laboratory animals, humane pest control, the training of guide dogs for the blind, humane technique in the laboratory, slaughtering problems, and animals and the law.

Fees, including full board and expeditions, are: students £3 10s.; seniors £6. Enquiries and applications accompanied by a deposit of 10s. should be made to Miss M. P. Williams, UFAW, 7a, Lamb's Conduit Passage, London, W.C.1.

UNIVERSITY NEWS

Edinburgh

The undermentioned candidates have passed the *Final Professional Examination* for the degree of *Bachelor of Veterinary Medicine and Surgery*:—

Bradley, Anthony Terence; Bradley, John Edwin; Brown, Kenneth; Clayton, Nigel Allen; Crawford, Samuel Brian; Dawson, John Robert Brotherhood; Ingham, Brian (with distinction); Jury, Olwen; McCaskill, Hugh; McMartin, Duncan Alexander; Mason, Eileen Catherine; Maxwell, Michael Denis; Morrow, William Terence; Rees, David Emrys; Ricketts, John Donald, and Wood, David James McGregor.

The undermentioned candidates have passed the *Third Professional Examination (Part I)* in *Veterinary Pharmacology* for the degree of *Bachelor of Veterinary Medicine and Surgery*:—

Booth, James M.; Care, Anthony D.; Davis, Marjorie A.; Downie, James G.; Gordon, Mary C. M.; Gunn, Sydney D.; Jones, Alan P.; Lawson, Gordon H. K.; Marshall, Leslie; Munro, David; Simpson, David T.; Ure, William S., and Watt, John G.

The undermentioned candidates have passed the *Third Professional Examination (Part II)* in the subjects of *Veterinary Pathology, Bacteriology,* and *Parasitology* for the degree of *Bachelor of Veterinary Medicine and Surgery*:—

Anderson, David A. Y.; Elliott, Jean; Grigor, John A.; Rogers, Elizabeth M.; Smith, Ian G. N., and Thomson, James W.

The undermentioned candidate has passed in the subject of *Veterinary Pathology*:—

Montgomery, John F.

The undermentioned candidates have passed in the subject of *Veterinary Bacteriology*:—

Anderson, William G. F.; Bewsher, Colin B.; Jackson, Jane M. T., and Mitchell, Benjamin.

The undermentioned candidate has passed in the subject of *Veterinary Parasitology*: —

The undermentioned candidates have passed in the subject of *Veterinary Anatomy and Histology* of the

Anderson, William G. F.

Second Professional Examination for the degree of *Bachelor of Veterinary Medicine and Surgery*:—

Sanderson, Michael G., and Wilson, Anna M. B.

The undermentioned candidates have passed in the subject of *Veterinary Physiology* (including *Biochemistry*):—

Atkinson, William I.; Davies, David W.; Harris, Grenville W.; Hunt, George E.; James, William T.; Seymour, Stanley, and Wahler, Saw.

The undernoted candidates have passed the *Part II Examination* for the *Diploma in Tropical Veterinary Medicine*:—

Chandra, Brij, M.R.C.V.S.; Gibbs, John Russell, M.R.C.V.S.; Herbert, William John, M.R.C.V.S.; Hyslop, Noel St. George, B.V.SC. (LIVERPOOL), M.R.C.V.S.; Imbabi, Salah Eldin, DIP. VET. SC. (KHARTOUM); Jawara, David Kwesi, M.R.C.V.S.; Jeganathan, Ponambalam, B.V.SC. (SYDNEY); Parker, William George Campbell, B.V.M.S. (GLASGOW), M.R.C.V.S.; Ross, James Peter Junor, M.R.C.V.S.; Symons, Geoffrey Brian, M.R.C.V.S.; Townsend, Gordon Harold, M.R.C.V.S.; Turton, John Duxbury, B.SC., M.R.C.V.S.; Willder, Arthur Gordon, M.R.C.V.S., and Yeoman, Guy Henry, M.R.C.V.S.

Glasgow

The Glasgow University Alumnus Association will hold its usual Dinner during Congress week. The Annual General Meeting and the Dinner will take place in the Lion Hotel, Cambridge, on August 29th, at 6 p.m. for 6.30. Tickets will be 18s. 6d. each.

Liverpool

At a meeting of the Council of the University held on June 25th, the following appointments were made, with effect from October 1st, 1057:—

Reader in Veterinary Anatomy, Mr. H. V. Hughes, B.V.SC., M.R.C.V.S., D.V.H. Senior Lecturer in Veterinary Bacteriology, Dr A. Buxton, PH.D., M.R.C.V.S.

★

A very happy and enjoyable ceremony was held at the Veterinary Field Station on the afternoon of June 27th when members of the Academic and Technical Staffs, with their wives, and graduates of the School assembled to express their good wishes to Mr. Robert Isherwood on the occasion of his retirement after 34 years on the teaching staff of the School. Mr. Isherwood was accompanied by his wife and his daughter. Many letters of regret for inability to be present were received, among which was a tribute in verse!

The Dean, Professor J. G. Wright, referred to Mr. Isherwood's 38 years' association with the School, 4 of which were spent as a student, and outlined Mr. Isherwood's subsequent career when, after service with the R.A.V.C. in France, Gibraltar, and India, he was appointed to the teaching staff in 1923. Although appointed a lecturer in veterinary anatomy, he was also responsible for the teaching of medicine, meat inspection, pharmacology, and materia medica. Later he was to become Administrator of the Veterinary Hospital, Secretary of the Board of Veterinary Studies, and, most recently, Sub-Dean of the Faculty of Veterinary Science. The Dean paid particular tribute to Mr. Isherwood's modesty, loyalty, and kindness. In closing, Professor Wright asked Mr. Isherwood to accept "this piece of apparatus"—a portable television set—which had been subscribed for by colleagues, academic and technical, and graduates.

After some of the senior members of the staff had expressed their good wishes, there followed Mr. Isherwood's reply, which was completely characteristic and to which no summary could do justice.

Degree of B.V.Sc. with Honours

CLASS II

Howell, J. M.

Ordinary Degree of B.V.Sc.

Ashworth, K. T.; Barrett, S.; Bolger, K.; Butler, C. L.; Bygrave, A. C.; Davies, E. B.; Ewbank, R.; Fraser, C. E. O.; Harrison, F. A.; Hilder, E. F.; Hobson, G. J.; Holmes, J. A. R.; Hughes, I. B.; Jenkinson. T. A.; Knifton, A.; Lancaster, R.; Malkinson, M. H.; Menear, H. C.; Murgatroyd, A. E.; Pickard, Barbara; Tandy, J.; Thake, G.; Tyler, J.; Whiteley, H., and Williamson, G. A.

Passed Final Examination (Part I) only

Dickinson, L. G.

Passed Final Examination (Part II) only

Ashcroft, R. A.

Degree of B.V.Sc. First Examination

PART I (CHEMISTRY)

Aldridge, Margaret C.; Arnott, J. N.; Bush, B. M.; Carter, D.; Cotgreave, D. H.; Davies, G. E. G.; Dunton, J.; Edwards, G. B.; Entwistle, M. P.; Giam, C. H.; Harding, A. J.; Horrocks, Susan; Kemble, P. R.; Kennington, D. A.; Littlewood, H. F.; Llewellyn, G.; Love-Jones, H.; Maclean, C. W.; Malone, J.; Moore, A.; Schmiegelow, Patricia; Smith, B. J.; Strawbridge, G. E.; Waugh, I. R.; Weinberg, R.; Whittaker, J. F., and Williams, G. V.

PART II (PHYSICS)

Aldridge, Margaret C.; *Arnott, J. N.; Brown, M.; Bush, B. M.; Carter, D.; Cotgreave, D. H.; Dunton, J.; Edwards, G. B.; Entwistle, M. P.; Giam, C. H.; Harding, A. J.; Horrocks. Susan; Hunt, H. S.; Kemble, P. R.; Kennington, D. A.; Littlewood, H. F.; Llewellyn, G.; Love-Jones, H..; Maclean, C. W.; Malone, J.; Moore, A.; Rutherford, R.; Schmiegelow, Patricia; Sewell, J. W.; Smith, B. J.; Strawbridge, G. E.; Waugh, I. R.; Weinberg, R.; Whittaker, J. F.; Williams, G. V., and Williams, M. H.

* Passed with Distinction.

PART III (BOTANY)

Aldridge, Margaret C.; Arnott, J. N.; Brown, M.; Bush, B. M.; Carter, D.; Cotgreave, D. H.; Davies, G. E. G.; Dunton, J.; Edwards, G. B.; Entwistle, M. P.; Giam, C. H.; Harding, A. J.; Horrocks, Susan; Hunt, H. S.; Kemble, P. R.; Kennington, D. A.; Littlewood, H. F.; Llewellyn, G.; Love-Jones, H.; Maclean, C. W.; Malone, J., Moore, A.; Sewell, J. W.; Smith, B. J.; Strawbridge, G. E.; Waugh, I. R.; Weinberg, R.; Whittaker, J. F.; Williams, G. V., and Williams, M. H.

PART IV (ZOOLOGY)

Aldridge, Margaret C.; Arnott, J. N.; Brown, M.; Bush, B. M. Carter, D.; Cotgreave, D. H.; Dunton, J.; Edwards, G. B.; Entwistle, M. P.; Giam, C. H.; Harding, A. J.; Horrocks, Susan; Kemble, P. R.; Kennington, D. A.; Littlewood, H. F.; Llewellyn, G.; Love-Jones, H.; Maclean, C. W.; Malone, J.; Moore, A.; Schmiegelow, Patricia; Sewell, J. W.; Smith, B. J.; Strawbridge, G. E.; Waugh, I. R.; Weinberg, R.; Whittaker, J. F.; Williams, G. V., and Williams, M. H.

Second Examination

PART I (VETERINARY ANATOMY, INCLUDING HISTOLOGY AND EMBRYOLOGY)

Batty, A. F.; Edwards, J. D. D.; Fitton, M. W.; Goulden, M. B.; Hanford, D. M., and Walker, J. M.

PART II (PHYSIOLOGY, INCLUDING BIOCHEMISTRY)

Batty, A. F.; Capron, T. K.; Chesworth, A. T.; Edwards, J. D. D.; Fitton, M. W.; Goulden, M. B.; Holt, H. J.; Miller, J. K.; Pickup, Pamela; Quartey-Cofie, J.; Walker, J. M., and Zannetti, P. J.

THE HAMPSHIRE CATTLE BREEDERS' SOCIETY

A number of interesting matters were discussed in the chairman's report at the recent Annual General Meeting of the Society. In the course of his speech, Mr. Gould said:—

" The outstanding feature is to mention the very satisfactory progress in the building of the Hampshire Cattle Breeders' Artificial Insemination Centre. The building will be completed in October; there will be an official opening at a later date to be arranged. The building incorporates a number of unique features decided upon after much consideration of existing centre buildings in this country and of plans of some from overseas. One important feature is the complete separation of the bull centre from the Lyndhurst subcentre and from the pig and private breeders' units.

" The 1956 picture in respect of breed demand is given in the Annual Report. The first five months of this year showed considerable change. First inseminations have shown a further increase of 10 per cent. over last year's record figures. There has, however, been a decided change in the breed demands: there is a reduction of 1 per cent. Shorthorn, and 4 per cent. Friesian inseminations, which is counterbalanced by 11 per cent. increase in Guernseys, 13 per cent. Ayrshire, 18 per cent. Jersey, 21 per cent. Hereford, and 36 per cent. Aberdeen Angus. There has also been an increase of 30 per cent. inseminations from private breeders' bulls.

" The Society is grateful to those Breed Societies which give their co-operation in the finding of that rather rare animal—the bull of proven merit. Even when found to be of merit within the individual herd, it does happen that use in overall artificial insemination shows in some instances that the bull is not able to produce consistent improvement outside of that particular herd environment. Artificial insemination would appear to be by far the most stringent test of a bull's capacity to beget improvement.

" There has been a spate of publicity recently in respect of the export of semen to countries overseas. We, as a Society, are not interested commercially, but we are vitally interested technically. Our experience in experimental export to date has been very valuable in the information which has been yielded in respect of the processing of deep-freeze semen, and handling and travelling over long distances for subsequent storage and use at a later date. In one experimental consignment sent to Australia in 1956, covering 4 breeds, a conception rate of 71 per cent. was obtained over 310 first inseminations—a remarkable achievement for deep-freeze semen despatched to the other side of the world and stored there over a period for use. It is a great credit to the efficiency attained at all stages on the part of our veterinary surgeon, Mr. D. H. L. Madden, and his technical staff.

" We have entered into a unique arrangement with the South Eastern Shorthorn Breeders' Association, and have evolved a proven sire progeny competition intended to discover outstanding bulls over a large area of the south. This guarantees the winner the sum of £1,000 for his bull for use at A.I. together with semen supplies for his own herd.

" In view of the emphasis on quality milk, progeny of the bulls of the Hampshire Cattle Breeders' Society will be tested by the Milk Marketing Board for solids-not-fat as well as butter fat.

" Pig inseminations are making headway. We hope to obtain better conception rates in the future and we feel it can become a great boon to the industry if increased efficiency in A.I. can be achieved."

THE EXPORT OF LIVE CATTLE

In reply to a question in the House of Commons on Monday, concerning the export of live cattle, the Minister of Agriculture said:—

"This matter has been considered by a working party of experts set up by the Council of the Western European Union. The council has approved the working party's recommendation that their conclusions should be forwarded to the governments of the Western European Union for any necessary action.

"The conclusions are that there should be adequate veterinary inspection at ports in this country to ensure that only those cattle that are fit to travel are exported to the Continent; that there should be no re-export of British cattle imported for slaughter by member countries; that the journey on the Continent should be as short as possible; and that there should be suitable lairages and arrangements for feeding and watering at slaughter-houses. The authorities of the countries concerned will endeavour to ensure that, where it is not already general practice, all British cattle will be slaughtered by electric stunning or by captive bolt pistol.

"The Secretary of State for Scotland and I have decided that the export of cattle for slaughter will be permitted only to those countries which undertake that the conclusions of the working party will be complied with, that the journey after disembarkation will be limited to 100 kilometres, and that the cattle will be slaughtered by one of the methods mentioned. These restrictions will have the same effect as those recommended by the Balfour Committee. They will be introduced as soon as the necessary arrangements can be made, which I hope will be by about the end of the month."

INDIVIDUAL FEEDING FOR PIGS

Experiments are being carried out at the North of Scotland College of Agriculture with individual feeding pens for pigs. Each pen admits one pig only, and when the animal enters the pen it automatically releases a trap door behind it. A disadvantage is the danger of injury. Large pigs of over 160 lb. have sustained "twisted intestines" in their rush to the individual pens, and a few pigs have been caught and killed in the trap doors. On the other hand, the system is said to ensure that all pigs receive an equal amount of food, and for experimental comparison of feeding-stuffs it is proving valuable.

"CALFETERIA"

Mr. H. J. Geddes, lecturer in Animal Husbandry at Sydney University, has done some interesting work on calf feeding. One result of this is a new and simple unit which, it is claimed, will replace bucket feeding and minimise digestive upsets.

Mr. Geddes has shown that digestive trouble in young calves may be due to hurried feeding. The new unit consists of a container fitted with a lid to which are attached 9 special teats. These teats have narrow openings through which the calves suck milk or milk substitute from tubes extending to the bottom of the container; each calf can drink only about 1 gallon in 12 minutes, and consequently the milk is evenly mixed with saliva and forms a more easily digested curd.

Other advantages are that the temperature of the feed is, because of the slow intake, relatively unimportant, and the angle of the teats ensures that the calf sucks with its head and neck in the same position as when drinking from the cow. The makers of the unit have christened it the "Calfeteria."

A BIRTHDAY HONOUR

Dr. W. R. Kerr, deputy director of the Northern Ireland Ministry of Agriculture research laboratory at Stormont, Belfast, was made a Companion of the Imperial Service Order in the recent Birthday Honours. His many friends among veterinary surgeons and scientists will wish to congratulate Dr. Kerr on adding this new distinction to his successful career.

R.C.V.S. OBITUARY

We record with regret the deaths of the following members of the profession:—

ANGUS, David Brown, 72, High Street, Eccleshall, Staffs. Graduated Glasgow, December 14th, 1938. Died June 26th, 1957, aged 41 years.

DUGDILL, Mathew, of Westbourne House, Patrington, Nr. Hull. Graduated Edinburgh, May 21st, 1894. Died June 28th, 1957, aged 84 years.

WHITE, James Harrison, 49, Arundel Avenue, Sefton Park, Liverpool. Qualified Edinburgh, December 22nd, 1893. Died July 1st, 1957, aged 86 years.

PERSONAL

Births

MACDONALD.—On June 27th, 1957, to Ann, wife of A. W. MacDonald, M.R.C.V.S., of 28, Gladstone Place, Brechin, a daughter.

WATTS.—On June 14th, 1957, at the Romilly Nursing Home, Cardiff, to Marian, wife of Evan T. Watts, M.R.C.V.S., of Highways, Broadway, Cowbridge, a daughter, Elspeth, sister for Catherine.

Mr. F. G. Brown, M.A., M.R.C.V.S., has been appointed veterinary adviser to Smith Kline and French Laboratories Ltd., of 120, Coldharbour Lane, London, S.E. Since 1951, Mr. Brown has been in general practice. Previously he was on the staff of the Royal Veterinary College.

COMING EVENTS

July

10th (Wed.). Meeting of the British Small-Animals Veterinary Association, Midlands Area, in the Chesford Grange Hotel (on the Kenilworth-Leamington Road) 2.30 p.m.

Annual General Meeting of the Animal Diseases Research Association at the Moredun Institute, Gilmerton, Edinburgh, 9, at 3 p.m.

12th (Fri.). Society of Practising Veterinary Surgeons; Council Meeting; Connaught Rooms, Great Queen Street, London, W.C.2, following B.V.A. Council Meeting.

16th (Tues.). Annual General Meeting of the Welsh Branch of the B.V.A. at the Belle Vue Hotel, Aberystwyth, 2.15 p.m.

17th (Wed.). Summer Meeting of the Mid-West Veterinary Association at the Berkeley Café, Clifton, 2.15 p.m.

18th (Thurs.). Meeting of the Supplementary Veterinary Register Division at 7, Mansfield Street, London, W.1, 2 p.m.

Summer Meeting of the Eastern Counties Veterinary Society at the Red Lion Hotel, Colchester, 11.30 a.m.

19th (Fri.). Summer meeting of the A.V.T. & R.W.s (Southern Region) at the University of Bristol Veterinary Laboratory, Langford House, Langford, Nr. Bristol, 12.15 p.m.

25th (Thurs.). Ordinary General Meeting of the Royal Counties Veterinary Association at the Royal Veterinary College, Streatley, 2.30 p.m.

26th (Fri.). General Meeting of the Yorkshire Veterinary Society in the Government Buildings, Crosby Road, Northallerton, 2.30 p.m.

August

25th-31st. 75th Annual General Meeting and Congress of the B.V.A. at Cambridge.

BRITISH VETERINARY ASSOCIATION QUARTERLY MEETINGS IN LONDON

Wednesday, July 10th, at 7, Mansfield Street, London, W.1.

10.00 a.m. Veterinary State Medicine Committee.
11.30 a.m. Farm Live-stock Committee.
2.15 p.m. Home Appointments Committee.

Thursday, July 11th, at 7, Mansfield Street, London, W.1.

10.00 a.m. Parliamentary and Public Relations Committee.
11.30 a.m. Small-animals Committee.
12.00 noon Finance Sub-committee.
2.15 p.m. General Purposes and Finance Committee.

Friday, July 12th, at Connaught Rooms, London, W.C.2.

10.30 a.m. Council Meeting.

ADDRESSES OF DISEASE INFECTED PREMISES

The list given below indicates, first the county in which are situated the premises on which disease has been confirmed, followed by the postal address and date of outbreak.

Anthrax

Hants. Wessex Slaughter-house Board, The Abattoir, Fontley, Faleham (June 27).

Surrey. Grayswood Farm, Grayswood, Haslemere (June 24).

Sussex. Upper Nash Farm, Nutbourne, Pulborough (June 22).

Fowl Pest

Aberdeen. Westercraigie, Whitecairns; Boghead Farm, Coull, Tarland (June 26).

Banff. Mill of Auchindown, Dufftown (June 27).

Lancs. Mere Farm, Mere Brow, Tarleton; Pleasant View, Marsh Lane, Longton (June 23); Rivington House, Marsh Lane, Longton (June 24); Woodnook, Marsh Lane, Longton; Redcot, Marshes Lane, Mere Brow, Tarleton (June 27).

Norfolk. Ash Tree Farm, Southrepps, Norwich (June 21).

Surrey. 20a, Smallholdings, Woodmansterne Lane, Wallington (June 21); 33, Little Woodcote Estate, Wallington (June 27).

Yorks. Church View, South Hutton, Thirsk (June 22); 103, Brook Lane, Clayton, Bradford (June 24); Barndose Farm, Crayke (June 25); Shawfield Farm Cottage, Tong, Bradford; Westfield Farm, Black Road, Leeds, 9 (June 27).

Swine Fever

Berks. The Piggery, R.A.F. Station, Abingdon (June 24).

Cambs. Fenny Lane Farm, Meldreth, Royston (June 25).

Ches. Orchard Farm, Nether Peover, Knutsford (June 24).

Glamorgan. Graigllwyd Farm, Talbot Green, Pontypridd; Balarat Farm, Pencoed, Bridgend (June 24); Fairview Bungalow, Cwmbach, Aberdare (June 26).

Gloucs. Village Farm, Elberton, Bristol (June 21).

Kent. Pond Farm, London Road, Newington, Sittingbourne (June 24).

Lancs. Lees Lane Piggery, Ashton-under-Lyne (June 21).

Lincs. The Grange, Heighington, Lincoln; Station Farm, North Hykeham (June 24).

Middx. Manor Farm, Cowley, Uxbridge (June 24).

Somerset. Wickham Farm, Marston Magna, Yeovil (June 21).

Staffs. 8, Sandwell Park, Park Lane, West Bromwich (June 24).

Surrey. Park Street Farm, Park Street, Bagshot (June 24); 70, Selsdon Park Road, Croydon (June 26).

Sussex. Marsh Buildings, Westham, Pevensey (June 21); Songhurst Farm, Loxwood, Billingshurst (June 24); Piggeries at Race Hill, Brighton (June 25); Gibbons Mill Farm, Billingshurst (June 26).

Warwicks. Oldford Farm, Aldridge Road, Perry Bar, Birmingham (June 24).

Worcs. Allotments, Stanley Road, Worcester (June 26).

CORRESPONDENCE

The views expressed in letters addressed to the Editor represent the personal opinions of the writer only and their publication does not imply endorsement by the B.V.A.

Two-way Radio Telephones

Sir,—It was most intriguing to read Mr. Straiton's account of the money saving value of V.H.F. 2-way radio telephone in a Midlands veterinary practice. The trouble in this practice (a mixed practice which should approximate reasonably closely with Mr. Straiton's) is that one's clients can contact one much too easily, for comfort, by means of the Post Office telephone system! The great majority of one's farmer clients are on the 'phone and are only too willing to pass messages on. One wonders how often Mr. Straiton's office finds it useful to revert to the land telephone when there is no reply from his car, left out of earshot of the cow-shed in which he is working?

Mr. Straiton's estimate of a saving of 75,000 road miles in a 5-car practice during the past 12 months

is surprising. It means a saving of 15,000 per car per year. In conversation with many colleagues in practices similar to the writer's, one finds that the usual annual mileage per car is about 22,000 and rarely more than 25,000. One wonders how many miles Mr. Straiton's cars travelled before the arrival of car radio telephones?

It has become increasingly apparent to the writer during these past 2 or 3 years that the economics of veterinary practice must be most carefully studied if a reasonable return is to be received by those of us engaged in it. Can it be that expenditure on a V.H.F. car radio installation is one of the ways to improve one's balance at the bank?

Yours faithfully,

EDWARD WILKINSON.

216, Osmaston Road,
Derby.

July 1st, 1957.

The Treatment of Hormone Deficiency Diseases in Neutered Male and Female Cats

Sir,—The prevalence of skin eruptions in neutered cats of both sexes, when viewed in conjunction with the difficulty encountered in obtaining a more or less permanent cure, has led me to feel that it is time some publicity were given to the subject.

The inducement to write this letter came to me when I read that written by W. E. M. Phillips, in the issue of THE RECORD dated June 15th, in which he records the successful use of testosterone implants in the treatment of alopecia in two spayed cats.

It has been my experience that, in male cats, a dry miliary eczema, and in female cats, a diffuse moist eczema, are by far the most common offenders.

The former condition, for long regarded by many as " fish eczema " has, in more recent times, been deemed due to a deficiency of the testicular hormone, particularly as it occurs almost, if not entirely, in neutered toms. I think it can safely be said that, in this condition, the treatment almost universally adopted nowadays is that of implantation with testosterone proprionate. With regard to the use of external dressings, this must be left entirely to the discretion of the individual practitioner.

My experience has been that whilst implantation frequently results in a cure, this is seldom of a permanent nature and is frequently followed by a recurrence of the trouble within a period varying from 5 months to a year.

In such cases, when a second implant has been given, results have not been so spectacular, and indeed the repeat treatment has often proved totally ineffective.

As this condition is increasing, I should be interested to learn the experiences of other veterinarians.

The spayed female presents an even more difficult problem, and one which, in my hands at least, has not readily responded to any particular line of treatment.

One case I have in mind is a tortoiseshell neuter of uncertain age, but probably about 4 or 5 years old. This cat was first presented to me in January, 1956, exhibiting typical eczematous lesions, and, for a time at least, was cleared up with a course of female hormone tablets. In June of the same year, a recurrence of the complaint was again successfully treated.

In January, 1957, the same cat was presented once again for attention and, on this occasion was treated with ACTH given by intramuscular injection on alternate days. After only 3 injections, the skin was " as new " and the case discharged. As on previous occasions the benefit proved to be short-lived, only 10 days elapsing before the case was again returned to me. Heartened by my previous success, I resumed treatment with ACTH, but no response was obtained.

Since then, a variety of treatments have been tried, including stilboestrol by injection 5 mg. dose; implantation with testosterone, in each case accompanied by external applications such as calamine and zinc lotion, tincture of penotrane, and similar preparations, but again without success.

Unless we are wrong in assuming that the condition is, in fact, one of hormone deficiency, how else can it be overcome? It would be most interesting to hear what others do in these cases.

Yours faithfully,

J. MARSHALL.

185, Upper Richmond Road,
Putney, S.W.15.

June 25th, 1957.

DISEASES OF ANIMALS ACT, 1950—GREAT BRITAIN

Summary of Returns of Confirmed Outbreaks of Scheduled (Notifiable) Diseases

Period		Anthrax	Atrophic Rhinitis	Foot-and-Mouth	Fowl Pest	Sheep Scab	Swine Fever
1st to 15th June, 1957		14	1	—	61	—	44
Corresponding period in	1956	11	1	—	28	—	32
	1955	23	—	—	5	—	100
	1954	8	2	—	16	—	78
1st January to 15th June, 1957		222	4	24	419	—	408
Corresponding period in	1956	1,003	6	12	269	—	350
	1955	425	—	6	247	—	771
	1954	144	3	12	528	—	721